CABI/EPPO distribution maps of plant pests and plant diseases and their important role in plant quarantine

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Never before has the need for accurate distribution data for plant pests been so important. CAB International (CABI) and EPPO are international organizations with a long history and strong involvement in collating and disseminating information on the global distribution of plant pests. Distribution Maps of Plant Pests and Distribution Maps of Plant Diseases, first published in 1951 and 1942, respectively, are respected, referenced sources of such data, expertly compiled and validated and used by plant health organizations around the world. They have been joint CABI/EPPO publications since 1997, and provide an essential complement to expanding knowledge on plant pest distribution. The Distribution Maps continue to be the most authoritative sources of information on the presence and extent of specific plant pests, sourced from the 4.5 million records in CAB Abstracts as a basis and numerous other sources. They also feed directly into CABI's Crop Protection Compendium (CPC) and EPPO's Plant Quarantine Data Retrieval System (PQR) databases. Their history, compilation and value are discussed.

Introduction

CABI is an independent international organization first established in 1910 as the Imperial Agricultural Bureaux, changing to the Commonwealth Agricultural Bureaux in 1947 and finally to CAB International in 1987. CABI also includes the former Commonwealth Institute of Entomology (CIE) and Commonwealth Institute of Mycology (CMI) created in 1947, which became International Institutes (IIE and IMI, respectively) in 1987, and now form part of CABI Bioscience, alongside the former International Institute of Biological Control (IIBC) and International Institute of Parasitology (IIP). CABI Publishing is a separate division responsible for producing the world-renowned Cab Abstracts database, books, journals and related publications and information products. EPPO (European and Mediterranean Plant Protection Organization) is the regional plant protection organization (RPPO) for Europe and the Mediterranean area, founded in 1951 with 15 member countries (and now with 46). It has throughout its history, further to its role in recommending harmonized phytosanitary measures to its member countries, been closely concerned with detailed information on quarantine pests.

The Distribution Maps of Plant Pests and Plant Diseases are old publications. Both series have a history stretching back over half a century; the disease maps were first published in 1942 by the Imperial Mycological Institute (later Commonwealth, then International Mycological Institute – CMI/IMI), and the pest maps were first produced in 1951, by the Commonwealth, then International Institute of Entomology (CIE/IIE): (CABI/EPPO, 2004a, b). Work on Distribution Maps was transferred to CABI Publishing in 1996. EPPO became involved during collaborative work with CABI on the EU-funded programme to produce the book *Quarantine Pests for Europe* (EPPO/CABI, 1997), with its own distribution maps (CABI/EPPO, 1998) and illustrations (EPPO/CABI, 1996). In 1997, EPPO also became associated with the CABI Distribution Maps.

The Distribution Map series cover important arthropod pests and pathogens affecting agriculture and forestry. Two sets a year of each map type have been produced in recent years, comprising mostly new maps and a number of map revisions. There are nine (arthropod) pests per map set, and 18 (fungus, bacterium, virus and, since 1999, nematode) disease maps per set. By the end of 2004, the total number of different species mapped in the series was 665 plant pests and 940 plant diseases, an overall total of 1605 different species. These figures do not include new editions, and many maps have been revised following changes to taxonomy or distribution, some a number of times (one has 11 editions). Maps are printed on loose-leaf paper, with the distribution records printed on the reverse and on supplementary pages if required, originally A5-size, but in A4 format since 1996. They are collated in special folders, allowing for their easy removal and replacement, e.g. when new editions are published. Indexes are updated biennially for both sets of maps. The websites at www.cabi.org and www.eppo.org can be consulted for further details of publications and activities.

Selecting species for mapping

The general criteria for species selection are: existence or currency of maps of pests of economic or phytosanitary importance, recent reports of spread, new proposals for phytosanitary categorization, feedback from customers, revised taxonomy which may render old map editions invalid, current interest requiring separate maps for subspecies, coverage in other CABI/EPPO programmes, and various topical reasons. Validators (see below) are sent provisional species lists for comment and to assist final selection. More pests and diseases are selected than are required each year, to allow for postponement of some maps due to problems revealed only during preparation, such as: distribution changing rapidly, new taxonomic uncertainty, important publications or survey results in preparation, or delays in obtaining information.

Compilation of records

Record sources

For each species selected for mapping, specially designed Distribution Map editing software is used to search the 4.5 million records in CAB Abstracts from 1973 to extract, for the given species name and its synonyms, a system-defined subset of CABPESTCD records containing geographic terms. The abstracts are sorted by country so that records can be compared and the most appropriate selected for inclusion on the map. Full papers are consulted as required. Notes and sources can be added and subnational distribution decided for large countries and countries with detached parts. A wide range of additional sources is also searched, including CPC and EPPO datasheets, previous map editions, CIH/CMI Descriptions (bacteria, fungi, nematodes, viruses), the PQR database (OEPP/EPPO, 2004), reference and specialist books and internet sources, and records are added as appropriate.

Taxonomic certainty

Distribution records are the basis for phytosanitary decision-making, but in order to obtain this, taxonomic accuracy is also essential. In order to produce an accurate distribution map, the precise taxonomic identity and synonymy of each pest must be understood in order to target literature searches as accurately as possible. Expert taxonomic input is also important at the verification stage, to ensure that only literature based on accurate identifications is included in the distribution data. Only when the specific limits of an organism have been ascertained can there be certainty as to its presence in a defined area.

Geographical accuracy

The area where a pest is present was originally indicated on the Distribution Maps by one or more continuous solid lines demarcating areas of known presence, with broken lines used occasionally to indicate uncertain limits to the distribution. These lines would divide a country if subnational information was available. However, for phytosanitary purposes relating to international trade, it is political units that are important, mainly at the national level. It was thus decided in 1996 to change the map style to note presence as discrete points and shading, by country, with subnational distribution points as appropriate, e.g. for large nations, dependencies or overseas territories. Some National Plant Protection Organizations (NPPOs) classify regulated pests for phytosanitary purposes as A1 (absent) or A2 (present but restricted) quarantine pests[1]. Regional plant protection organizations (RPPOs) such as EPPO use equivalent concepts at the continental scale, so that, for example, an EPPO A1 pest can be positively presumed (by international recognition between the member countries) not to be present in any EPPO country. Though knowledge of subnational distribution is important for some applications, it is presence or absence at country level that is the principal requirement for phytosanitary decision making.

Record reliability

Assuring the accuracy of individual records is a key role of the mapping process. Preferably, records should be from primary sources (results of surveys or positive identifications), published in peer-reviewed publications, and from persons or authorities free from political or commercial bias. These preferences cannot always be reconciled. Thus, the results of official surveys and diagnoses are mostly not published in peer-reviewed journals, articles in peer-reviewed journals are not necessarily examined closely for the validity of geographical distribution information, and excellent scientists may have strong prejudices. Official reports from countries (of presence or absence) often take the form simply of a signed letter, hardly meeting the above criteria, but they are a valuable source which must in principle be taken into account.

Quite often, records have to be taken from reviews, which are only secondary sources and may be based on unsubstantiated or unreliable primary sources. In a few cases, where other sources are lacking, unpublished information from a scientist of known and respected international reputation may be used. It is not uncommon to find that following the trail of a record results in a 'loop' where no primary source can be located, or in the discovery that respectable publications, or individual scientists, have successively taken up a record whose primary source is quite unreliable. Thus, in the final analysis, the coordinator has to make judgements about records. They can either be included, indicated as doubtful, or excluded altogether. For the Distribution Maps, only one of these outcomes appears (though when the record is included, several references may be given to support it).

It may be noted that the PQR database system of EPPO follows a different philosophy. In difficult cases, conflicting

[1]In principle, in accordance with the New Revised Text of the IPPC, they may also classify them as 'regulated non-quarantine pests' (RNQPs), which are by definition present. This category is only just beginning to be used in practice.

records for a particular pest/country combination are all included, and the conflict is commented (though the editor still indicates one record as being preferred). In addition, old mistaken records are retained and indicated as such, so it is clear to the user that they have not been overlooked.

Disappearance of pests

One aspect of the Distribution Maps which has been introduced since EPPO was involved is the recognition, important for phytosanitary purposes, that pests can disappear from a country. They may be eradicated, there may only have been a short-lived outbreak, the crop in question may no longer be cultivated, or the pest may simply disappear. Such records are not shown on the maps, but are mentioned in the text, with special codes attached. The coordinator again has to make an expert judgement of each such case. Often, the country concerned initiates the process, asking for records to be deleted. But it is better to present the situation accurately: there was indeed an old good record, but the pest has indeed disappeared.

Expert validation

All draft maps are sent to expert validators for checking. The validators receive: the distribution list with references, the printed map, a validation sheet with queries that may have arisen during compilation, the previous map if the map is a revision, and abstracts, web pages or other information if deemed necessary. Coordination and validation of most Pest Maps (arthropods) is presently undertaken at the Natural History Museum (NHM), London, of most Disease Maps (fungi, bacteria) by CABI Bioscience and of viruses by independent consultants[2]. Specimen records from CABI, NHM or national collections are included where possible. The coordinator incorporates all validators' comments and additional country records, and conducts any further searches or enquiries (to national official contacts) as required. Second map drafts are sent to EPPO for final validation. EPPO's role includes: (1) providing and checking records from the PQR database which are often derived from complementary sources to the published literature records compiled at CABI, such as NPPO communications, responses to EPPO's pest questionnaires, information from phytosanitary meetings at regional or global level; (2) confirming the status of quarantine pests for, or in, Europe; (3) addressing the phytosanitary implications of new records; and (4) using the EPPO network of contacts to resolve queries.

Publication and follow-up

Final maps and indexes are generated for printing. Each year, the information from the maps is then fed back to other publications. In particular, the CABI CPC (Crop Protection Compendium) may be updated, and data is converted to a special format and sent to EPPO for incorporation into the latest version of PQR. These three publications constitute a CABI/EPPO trilogy of interconnected databases, the map programme providing the opportunity for the most thorough research and focus on distribution.

After map publication, queries are sometimes received from NPPOs or others, challenging certain records. Researchers or plant health experts may also notify differences between maps and other published data sources. All these queries are researched, responded to and resolved. Correspondents are requested to provide details including references, or in their absence, an official statement that will be acceptable to other map users, to support the status. This may be a very time-consuming process but, as CABI prides itself on the publication of globally authoritative information, it is essential that such queries are dealt with thoroughly. Costly trade relations may be put at stake. Corrections are fed back to the easily corrected serial publications CPC and PQR, and in appropriate cases revised maps are published.

An example of such a revision concerns *Maconellicoccus hirsutus*, the pink hibiscus mealybug (Fig. 1). A first map was published in 1959, when this pest had not started to travel around the world. A first revision published in 1987 indicated presence in Africa, Asia and Australia. This was revised again in 1997, following new records in the Caribbean and the Pacific. Recent rapid spread, with additional new records in northern South America, the Caribbean, Central America, the USA and the Pacific led to calls for a third revision in 2002, postponed until 2004 while awaiting the publication of new surveys.

Importance for plant quarantine

With the increase in global trade, there is a corresponding increase in awareness of the need to prevent the introduction of potentially damaging pests. For those responsible for phytosanitary measures, accurate mapping of plant pest distribution is seen to be more and more important. CABI, as an independent international organization, is well placed to produce this information, which is also validated by independent experts and by EPPO, a regional organization with international links. Indeed, the Distribution Maps have for many years been globally accepted by NPPOs, RPPOs and other organizations and government departments involved in phytosanitary policy- and decision-making as the original, verified publications specifically developed to document the global distribution of plant pests. Later publications, notably the Crop Protection Compendium (CPC), EPPO's PQR, and the CABI/EPPO Distribution Maps of Quarantine Pests for Europe, have simply inherited much of their geographical distribution data from the Distribution Maps, and continued to follow the earlier standards used for compiling and validating data.

The essential importance of the CABI/EPPO Distribution Maps is that they are the only validated publication that prints the original references for pest presence for each record. This allows users to trace records to original reports in the published

[2] Currently coordinated, among the authors, by G.W. Watson, B. Ritchie and A.A. Brunt, respectively.

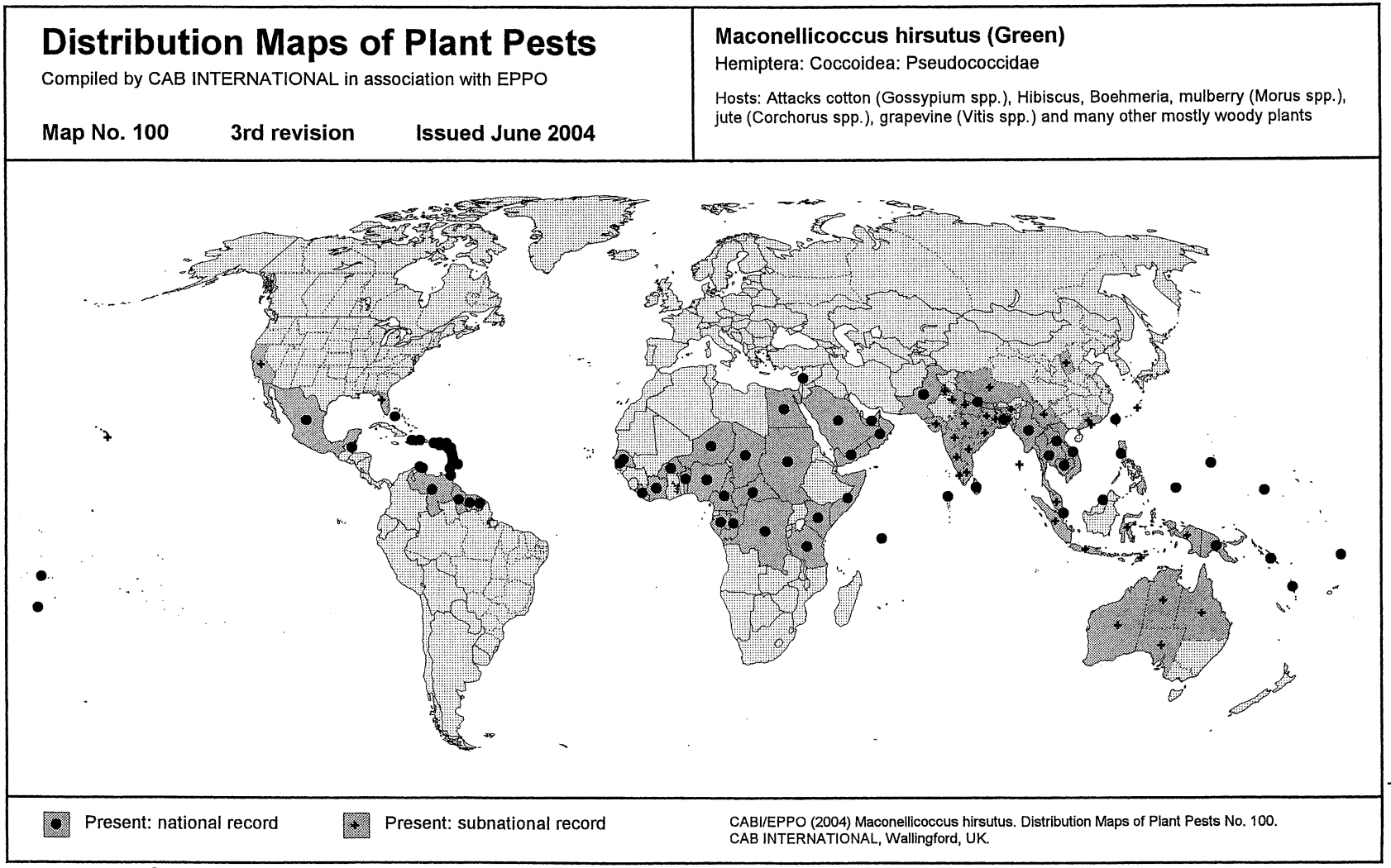

Fig. 1 A typical Distribution Map, with the first of five pages of supporting literature and collection records included. Correct citation: CABI (2004) *Maconellicoccus hirsutus*. *Distribution Maps of Plant Pests* no. 100 (3rd revision). CAB International, Wallingford, UK.

Note: Syn. Phenacoccus hirsutus Green.

Records are based on bibliographic data from the CAB ABSTRACTS database, voucher specimens in The Natural History Museum, London (NHM records) and plant quarantine information compiled by EPPO
X: Present, no details A: Present: widespread B: Present, restricted distribution C: Present, few occurrences (D): Absent, formerly present (E): Eradicated (F): Intercepted only

ASIA

Bangladesh	-	X	Chowdhury, S. H.; Ullah, G. M. R. (1984) Bangladesh Journal of Zoology 12 (1), 43. [Patia, Chittagong.]
			Williams, D. J. (1996) Bulletin of Entomological Research 86 (5), 617-628.
			Williams, D. J. (2004) Mealybugs of Southern Asia. Southdene SDN. BHD, Kuala Lumpur, Malaysia, 405-408.
			NHM (1979); (1981); (1993). [Srimangal, Chittaging, Ishurdi.]
Brunei Darussalam	-	X	McCrae, D. J. (1981) Insects of agricultural importance in Brunei. Brunei Press, Kuala Belai, Brunei, 22.
			Williams, D. J. (1996) Bulletin of Entomological Research 86 (5), 617-628.
			Williams, D. J. (2004) Mealybugs of Southern Asia. Southdene SDN. BHD, Kuala Lumpur, Malaysia, 405-408.
			NHM (1976). [Jerudong.]
Cambodia	-	X	Nickel, J. L. (1979) Annotated list of insects and mites associated with crops in Cambodia. CIAT, Cali, Colombia, 60.
			Williams, D. J. (1996) Bulletin of Entomological Research 86 (5), 617-628.
			Williams, D. J. (2004) Mealybugs of Southern Asia. Southdene SDN. BHD, Kuala Lumpur, Malaysia, 405-408.
China	-	B	
	Guangdong	X	Tang, F. D. (1992) The Pseudococcidae of China. Chinese Agricultural Science Technology Press, Beijing, China, 501-502.
			Wu, C. F. (1935) Catalogus Insecta Sinica 2, 177. [Guangzhou.]
	Hong Kong	X	Hill, D. S.; Hore, P.; Thornton, I. W. B. (1982) Insects of Hong Kong. University Press, Hong Kong, China.
			Williams, D. J. (1996) Bulletin of Entomological Research 86 (5), 617-628.
			NHM (1970); (1979); (1992). [Ta Kwu Ling, Ma Po Marsh.]
	Macau	X	EPPO (2004) PQR database (version 4.3).
	Shanxi	X	Tang, F. D. (1992) The Pseudococcidae of China. Chinese Agricultural Science Technology Press, Beijing, China, 501-502.
	Xizhang	X	Wang, T. C. (1981) Insects of Xizhang 1, 283-294.
	Yunnan	X	Williams, D. J. (1996) Bulletin of Entomological Research 86 (5), 617-628.
India	-	A	
	Andaman and Nicobar Islands	X	Varshney, R. K. (1982) Records of the Zoological Survey of India 80 (1/2), 107-109.
			Williams, D. J. (1996) Bulletin of Entomological Research 86 (5), 617-628.
			NHM.
	Andhra Pradesh	X	Murthy, G. R.; Babu, T. R. (1996) Journal of Research ANGRAU 24 (1/2), 87-91.
			Reddy, A. R.; Lakshminarayana, K. (1989) Indian Journal of Entomology 49 (3), 449-450. [Hyderabad.]
			Williams, D. J. (2004) Mealybugs of Southern Asia. Southdene SDN. BHD, Kuala Lumpur, Malaysia, 405-408.
			NHM (1982). [Hyderabad.]
	Assam	X	Dutt, N. (1964) Indian Farming 14 (2), 9-10.
			Williams, D. J. (1996) Bulletin of Entomological Research 86 (5), 617-628.
	Bihar	X	Singh, M. P.; Ghosh, S. N. (1970) Indian Journal of Science and Industry, A 4 (2), 99-105.
			Williams, D. J. (1996) Bulletin of Entomological Research 86 (5), 617-628.
			Williams, D. J. (2004) Mealybugs of Southern Asia. Southdene SDN. BHD, Kuala Lumpur, Malaysia, 405-408.
			NHM (1940); (1969); (1980). [Pusa, Ranchi.]
	Delhi	X	Williams, D. J. (1996) Bulletin of Entomological Research 86 (5), 617-628.
			Williams, D. J. (2004) Mealybugs of Southern Asia. Southdene SDN. BHD, Kuala Lumpur, Malaysia, 405-408.
			NHM (1964).
	Gujarat	X	Muralidharan, C. M.; Badaya, S. N. (2000) Indian Journal of Agricultural Sciences 70 (10), 705-706. [First recorded in the Wagad cotton belt in 1997.]
			Patel, I. S.; Dodia, D. A.; Patel, S. N. (1990) Indian Journal of Agricultural Sciences 60 (9), 645.
			Williams, D. J. (2004) Mealybugs of Southern Asia. Southdene SDN. BHD, Kuala Lumpur, Malaysia, 405-408.
			NHM (1988). [Banas Kantha.]
	Karnataka	X	Ahamed, C. A. A.; Chandrakala, M. V.; Maribashetty, V. G. (1999) Entomon 24 (3), 265-273.
			Balikai, R. A.; Bagali, A. N. (2000) Agricultural Science Digest 20 (1), 62-63.
			Mani, M.; Thontadarya, T. S. (1987) Current Science, India 56 (22), 1192.
			Williams, D. J. (1996) Bulletin of Entomological Research 86 (5), 617-628.
			Williams, D. J. (2004) Mealybugs of Southern Asia. Southdene SDN. BHD, Kuala Lumpur, Malaysia, 405-408.
			NHM (1940); (1986); (1990). [Kollegal, Palmabol, Mysore.]
	Kerala	X	Williams, D. J. (1996) Bulletin of Entomological Research 86 (5), 617-628.
			Williams, D. J. (2004) Mealybugs of Southern Asia. Southdene SDN. BHD, Kuala Lumpur, Malaysia, 405-408.
			NHM (1940). [Malabar.]
	Madhya Pradesh	X	Williams, D. J. (1996) Bulletin of Entomological Research 86 (5), 617-628.
			Williams, D. J. (2004) Mealybugs of Southern Asia. Southdene SDN. BHD, Kuala Lumpur, Malaysia, 405-408.
			NHM (1977). [Jabalpur.]
	Maharashtra	X	Mani, M. (1994) Progressive Horticulture 26 (1/2), 106-108.
			Williams, D. J. (1996) Bulletin of Entomological Research 86 (5), 617-628.
			Williams, D. J. (2004) Mealybugs of Southern Asia. Southdene SDN. BHD, Kuala Lumpur, Malaysia, 405-408.
			NHM (1969); (1991); (1992). [Nagpur, Akola, Rahuri.]
	Orissa	X	Williams, D. J. (1996) Bulletin of Entomological Research 86 (5), 617-628.
			Williams, D. J. (2004) Mealybugs of Southern Asia. Southdene SDN. BHD, Kuala Lumpur, Malaysia, 405-408.
			NHM (1980); (1982); (1983). [Bhubaneswar, Mayurbhani, Dhenkanal.]
	Punjab	X	Williams, D. J. (1996) Bulletin of Entomological Research 86 (5), 617-628.
			Williams, D. J. (2004) Mealybugs of Southern Asia. Southdene SDN. BHD, Kuala Lumpur, Malaysia, 405-408.
			NHM (1976). [Ludhiana.]
	Tamil Nadu	X	Baskaran, R. K. M.; Lakshmi, L. G.; Uthamasamy, S. (1999) Pest Management in Horticultural Ecosystems 5 (1), 28-31.
			Gangwar, S. K.; Thangavelu, K. (1991) Indian Phytopathology 44 (4), 545-549.
			Williams, D. J. (1996) Bulletin of Entomological Research 86 (5), 617-628.
			Williams, D. J. (2004) Mealybugs of Southern Asia. Southdene SDN. BHD, Kuala Lumpur, Malaysia, 405-408.

Fig. 1 Continued

literature, through abstracts in the older editions, or by providing full references in the newer editions wherever possible, including records from other reputable secondary sources. Specimen records are also provided in some cases. The range of sources used in map compilation is increasing, and the 'double-validation' by species experts and EPPO is being intensified.

In recent years, the Distribution Maps have enabled NPPOs to follow more stringently international guidelines such as the International Standards on Phytosanitary Measures (ISPMs) of the International Plant Protection Convention (IPPC) (IPPC, 1999a), under the auspices of the Food and Agriculture Organization (FAO) of the United Nations. For example, the Distribution Maps are cited in the appendix of ISPM no. 8, Determination of Pest Status in an Area (IPPC, 1999b), which notes that they are among the references which are 'widely available, easily accessible and generally recognized as authoritative'. Many other ISPMs cover in detail aspects of regulatory frameworks for phytosanitary purposes, noting the requirement for accurate and reliable data on plant pest distribution, essential in particular when undertaking pest risk analyses (PRA). Maps also have numerous other applications such as the compilation of definitive lists of important species that are present in (or need to be excluded from) a particular country, or estimating the risks of pathways from sources where certain species are known to be present.

The Distribution Maps have additional roles, with indirect effects on plant quarantine. Map editions act as an archive, like a photographic record, accurate at the time of publication, but updated only from time to time. In contrast, the CPC and PQR are updated at least annually and contain mainly the most current information. From a series of successively revised maps, users are able to make studies on the previous spread of plant pests over time and to predict future spread. The Distribution Maps are also an essential cornerstone to many other publications used by NPPOs.

In conclusion, decisions based on geographical distribution data have significant economic impacts for exporting and importing countries, and are increasingly open to challenge. According to the SPS (Sanitary and Phytosanitary) Agreement of the World Trade Organization (WTO) (WTO, 1994), phytosanitary measures have to be 'scientifically justified'. In practice, NPPOs have therefore to take care, in advance of any possible dispute, to determine the scientific documentation which they can cite as justification. As far as possible, this should be documentation of the highest quality and, for geographical distribution information, the CABI/EPPO Distribution Maps have an established reputation. It is of great importance for NPPOs worldwide that this high quality should be maintained, that maps should be kept up to date, and that the scope of the Distribution Maps should be extended to cover as many as possible of the pests which are of phytosanitary significance.

Developments and future prospects

CAB Abstracts is the present base for data compilation, providing data from its 4.5 million records, dating back to 1973 for most journals. The Heritage Project is an ambitious programme in which all the pre-1973 abstract journals are being captured electronically, also adding standardized search terms to the 2.25 million records estimated to be held. Of specific interest to mapping work will be all records from the Review of Applied Entomology (RAE) back to 1913, the Review of Applied Mycology (RAM) back to 1922, and Helminthological Abstracts back to 1932. This will be particularly helpful for identifying first records and in updating old maps, and tracing the paths of past pest movements. Use of old abstract volumes is presently limited to specific cases, due to the time-consuming nature of such searches. Completion of the Heritage Project in early 2005 will make access much easier, and will significantly enhance the value of future maps. Indexes of all species included in the Distribution Maps of Plant Pest and Plant Disease are also now available on the CABI website (www.cabi.org), and a further project is under way to make all Distribution Maps, current and back issues, available electronically (planned for completion by early 2006).

Developments to other databases will enhance the accuracy of the information in the maps. EPPO's website (www.eppo.fr) now contains enhanced distribution data on a number of specific pests, and in particular addresses the pests of the EPPO Alert List. The IPPC in principle obliges its contracting parties to report pests presenting 'an immediate or potential danger' (IPPC, 1999a), as further developed in ISPM no. 17 on Pest Reporting (IPPC, 2002), whereas CABI and EPPO are not the beneficiaries of such a specific obligation. The IPPC reporting obligation ought to be a very valuable basis for new geographical distribution information, but it has unfortunately been 'more respected in the breach than in the observance'. The IPPC Secretariat is now instigating improved reporting of pests by NPPOs, through its International Phytosanitary Portal (IPP), making maximum use of electronic means of communication.

A desirable development would be better harmonization between different pest distribution databases. There continue to be discrepancies in terms of the categories of presence (extent codes) employed and the geographical entities which are mapped (especially concerning island states and dependencies). CABI and EPPO welcome suggestions from subscribers, users and members on any developments which they consider would increase the value of the Distribution Maps.

Acknowledgements

We would like to thank the many species experts in CABI Bioscience, the Natural History Museum, EPPO and independent consultants who validate individual pest and disease maps, and without whose expertise the maps would not be globally recognized as the authoritative products that they are. Thanks are also due to the many others involved in map production and distribution, and to subscribers for acknowledging their importance, and for continuing to support this uniquely valuable publication.

Cartes de répartition géographique des ravageurs et maladies des végétaux CABI/OEPP et l'importance de leur rôle en quarantaine végétale

Jamais auparavant le besoin de données sur la répartition géographique précise des organismes nuisibles aux végétaux n'a été aussi important. CAB International (CABI) et l'OEPP sont des organisations internationales qui ont une longue histoire et une forte implication dans la collecte et la diffusion d'informations sur la répartition des organismes nuisibles aux végétaux dans le monde. Les Cartes de répartition géographique des ravageurs et des maladies des végétaux (Distribution Maps of Plant Pests et Distribution Maps of Plant Diseases), publiées pour la première fois en 1951 et 1974 respectivement, sont des sources respectées et référencées de telles données, assemblées et validées par des experts et utilisées par les organisations de protection des végétaux dans le monde entier. Ce sont des publications conjointes CABI/OEPP depuis 1997, et elles fournissent un complément essentiel pour améliorer la connaissance de la répartition des organismes nuisibles aux végétaux. Les Cartes de répartition géographique continuent d'être la source d'information la plus reconnue sur la présence et l'importance d'organismes nuisibles spécifiques, elles sont basées sur les 4,5 millions de données des CAB Abstracts et de nombreuses autres sources. Elles alimentent aussi directement les bases de données Crop Protection Compendium (CPC) de CABI et Plant Quarantine Data Retrieval System (PQR) de l'OEPP. Leur histoire, leur confection et leur valeur sont discutées.

Карты CABI/EOKЗР распространения вредителей и болезней растений и значимость их роли в карантине растений

Никогда прежде потребность в точных данных о распространении вредных для растений организмов не была столь важной. CAB International (CABI) и EOKЗР – международные организации с давней историей и большой вовлечённостью в работу по сопоставлению и распространению информации о распространении вредных для растений организмов в мире. Карты распространения вредителей и болезней растений, впервые опубликованные в 1951 и 1974 гг. Соответ-ственно, являются признанными источниками, на которые дается множество ссылок. Эти данные с собираются экспертами, подтверждаются и используются фитосанитарными организациями во всем мире. С 1997 г. они стали объединенными публикациями (CABI/EOKЗР) и являются существенным дополнением к расширяющемуся знанию о распространении вредных для растений организмов. Карты распространения продолжают являться наиболее авторитетными источниками информации о присутствии и распространении определенных вредных для растений организмов, собранной на базе 4,5 миллионов записей в Аннотациях CABI в качестве основы, а также на базе многочисленных других источников. Они также подпитываются непосредственно через Компендиум по защите растений CABI (CPC) и Поисковую систему данных по карантину растений EOKЗР (PQR). В статье рассматриваются их история, методика компиляции и значение.

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